

# Combined Power's Hyperlight™ – A New Utility-Scale Concentrated Solar Power Technology

December 2012

## Fact Sheet

### The Issue

Utility-scale solar generation will play an important role in helping California achieve its goal of 33 percent of the state's electricity being derived from renewable energy sources. Such large solar developments, however, have significant land and water requirements, resulting in negative effects on California's fragile desert ecosystems. There is a need for new solar technologies with reduced land and water demands to meet California's ambitious renewable energy target while preserving our precious ecosystem.

### Project Description

This project will demonstrate a utility-scale concentrated solar power technology from Combined Power Cooperative called Hyperlight™. Hyperlight™ uses reflectors in long transparent plastic tubes resting in shallow ponds to reflect sunlight onto a heat collecting element centered above the array of tubes. Because this technology does not require the large amounts of glass and steel conventional reflector fields require, capital, installation and operating costs are much lower. Because of this design, the Hyperlight™ can be economically installed on a wider range of terrain and land types than current solar technologies, while also reducing the costs associated with power plant cooling. This technology is expected to be cost-competitive with fossil fuel energy sources. The estimated cost of a Hyperlight™ installation at the utility scale is \$1 to \$2 per watt, which is significantly lower than current costs for concentrated solar power installations.

Hyperlight™.



Source: Combined Power Cooperative.

Since the Hyperlight technology has lower land requirements than conventional reflector fields this allows greater usage of disturbed and developed lands to expand site selection options. This will increase opportunities to avoid undisturbed habitats and large areas of remote and environmentally sensitive desert lands, as are currently needed for large-scale solar developments.

The project goals are to:

- Increase the geometric concentration ratio (the ratio of a solar collector aperture area to the absorber area) achieved with the Hyperlight™ reflector system from its current value of 17x to 70x.
- Improve the annual average thermal efficiency of the system from its current approximate value of 17 percent to 30 percent.

- Improve evaporative loss performance of the cooling system from its current value of more than 70 percent below open pond evaporation rate to more than 90 percent below open pond evaporation rate.
- Validate existing models for their system to within 25 percent for kilowatt hour heat removed per kilowatt hour of air blower power used.

## PIER Program Objectives and Anticipated Benefits for California

This research has the potential to significantly reduce the cost of concentrated solar power systems. Cost, in particular materials cost, has been the fundamental barrier to the installation of concentrated solar power in California. With Hyperlight™'s advanced technology, concentrated solar power projects will have lower environmental impacts, including reduced water and space requirements. This project addresses the renewable electricity generation, and contributes to an advanced technology that reduces land and water demand while increasing the use of renewable energy resources. Thus, this project will benefit California residents by providing a clean, safe, and secure source of energy at lower cost while reducing environmental impacts.

## Project Specifics

Contract Number: 500-10-063

Contractor: Combined Power Cooperative

Contract Amount: \$1,000,000

Contract Term: June 2011 to March 2015

For more information, please contact:

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